BigBOSS
Quasar/LyA Forest Targeting

Nic Ross (LBNL)

BigBOSS Collaboration Meeting

LBNL

19 November 2009

Bigg BOSS

India's version of "Big Brother..." (groan)

http://www.youtube.com/watch?v=OCEGBgQyh54

Outline

1. BigBOSS Quasar Survey: 1<z<2

2. BigBOSS LyA Forest Survey: z>2.2

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1. BigBOSS Quasar Survey: 1<z<2

2. BigBOSS LyA Forest Survey: z>2.2

(Broad) Lines

	z=1.0	z=1.7	z=2.0	z=2.2
LyA	2430	3280	3645	3890
CIV	3098	4182	4647	4957
CIII]	3816	5151	5724	6106
MgII	5600	7560	8400	8960
[OIII]	10,014	13,519	15,021	16,022
Hα	13,130	17,722	19,692	21,005

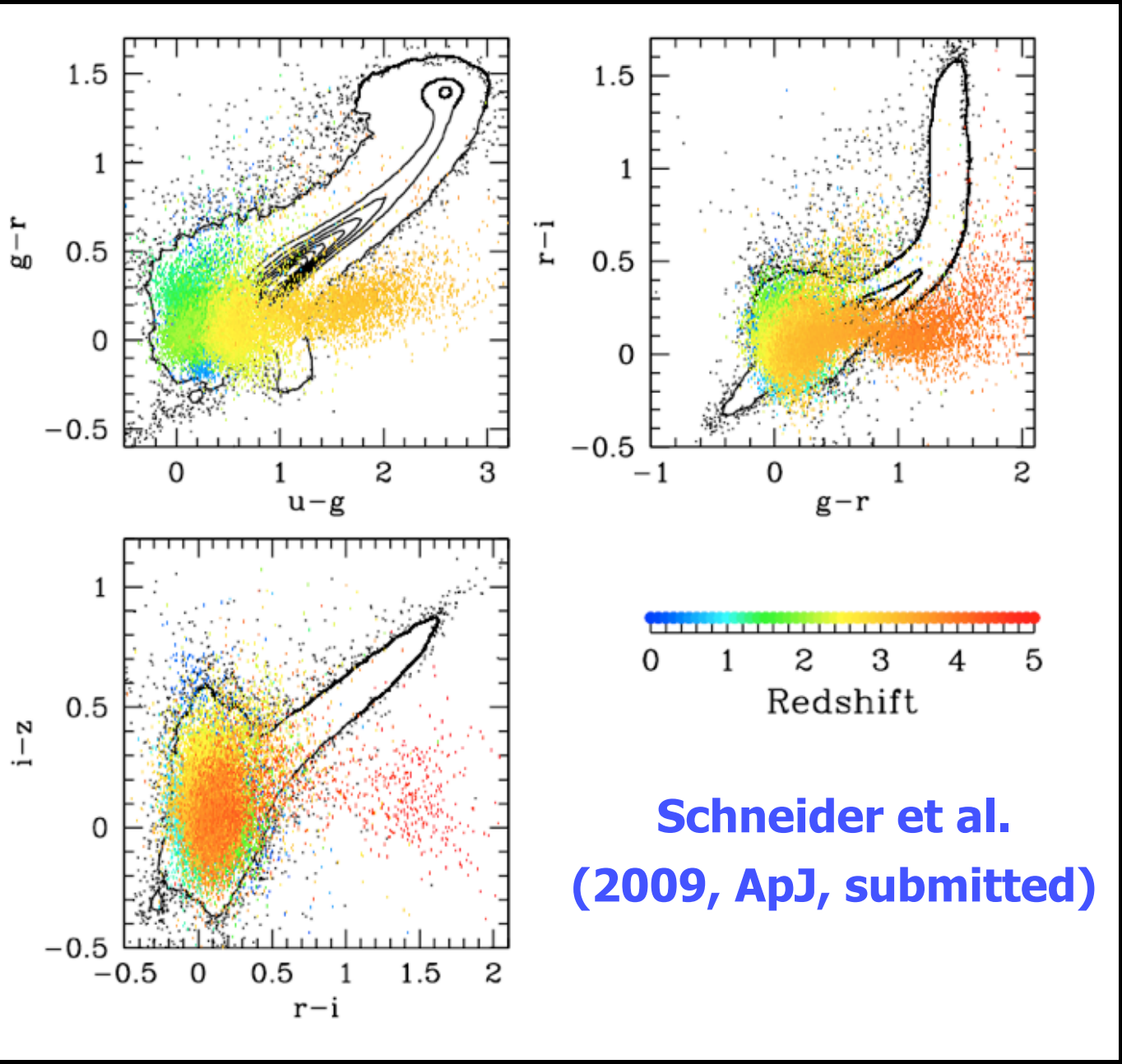
BigBOSS Quasar Survey - Requirements

- 2.7 million quasars
- Redshift range $1.0 < z < 2.0$
- Target density 150 $\deg^{-2}$
- Limiting magnitudes

$$(u, g, r, i) = (24.0, 23.5, 23.3, 23.1)$$

THIS IS THE HARD BIT....

Good news...



Schneider et al.

(2009, ApJ, submitted)

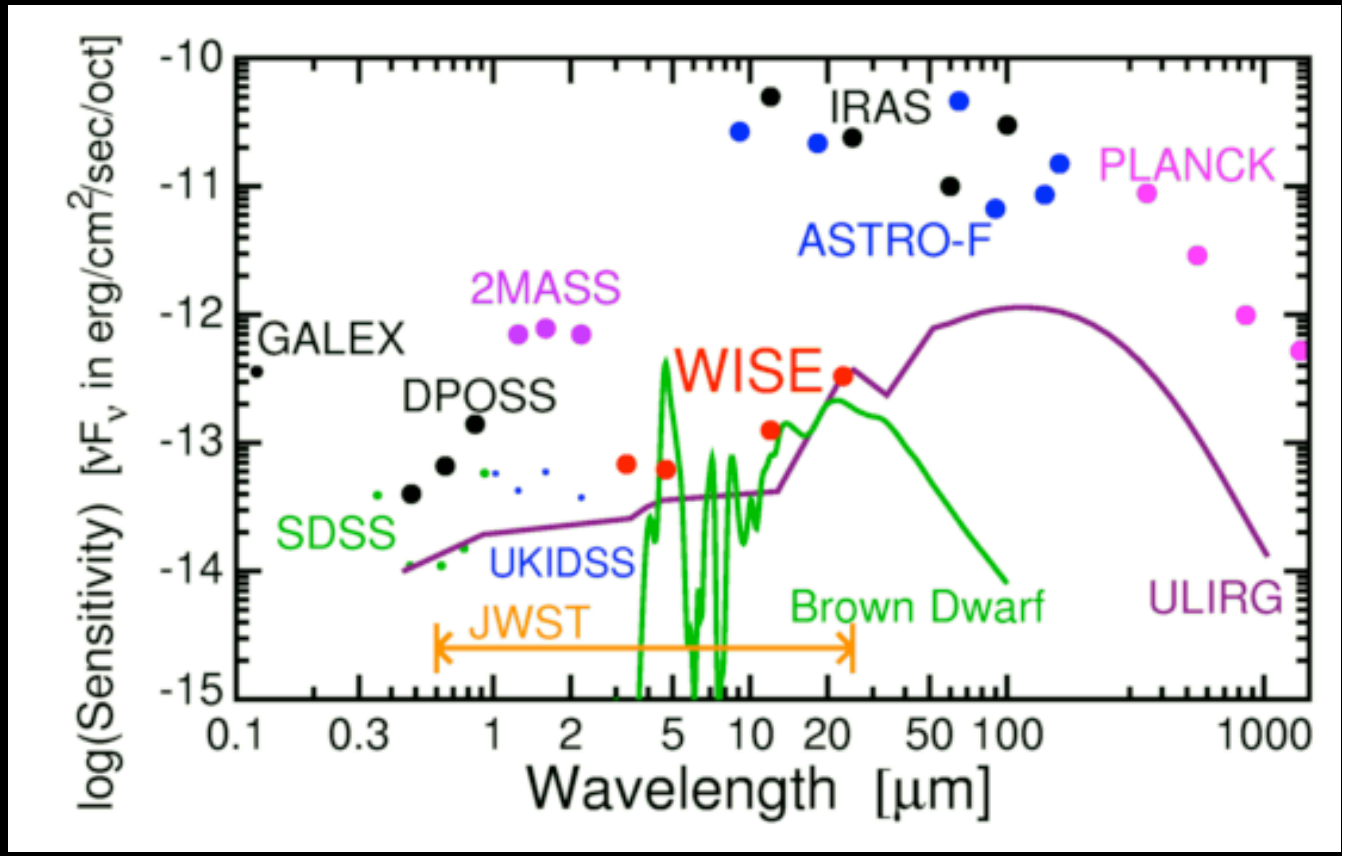
Today...

- Photometric DR6 Quasar Catalogue (Richards et al. 2009)
- 1.1 million photometrically selected quasars, i=21.3
- ~300,000 with 1.0<z<2.0 @ 35 deg^{-2}
- Efficiency > 90%

WISE (Wide-field Infrared Survey Explorer)

http://www.astro.ucla.edu/~wright/WISE/

- MIDEX Class mission (WMAP, *Swift*)
- 3.3, 4.7, 12 and 23 μm
- 40 cm
- Whole sky, 47 arcminute FoV; 11s exposures



- Probably too shallow for new Type 1 Quasars
- Very good for obscured Type 2 AGN e.g. Assef et al. arXiv:0909.3849v2

Outline

1. BigBOSS Quasar Survey

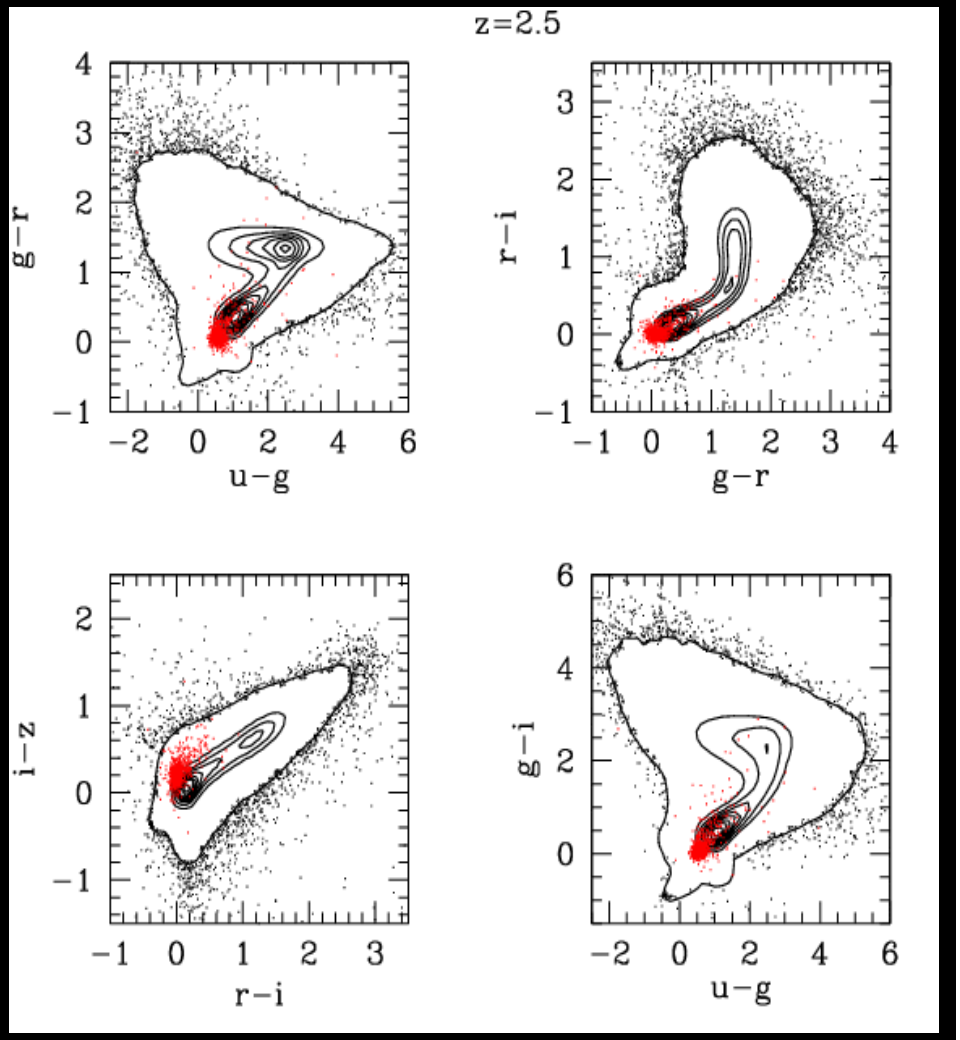
2. BigBOSS LyA Forest Survey

BigBOSS LyA Survey - Goals

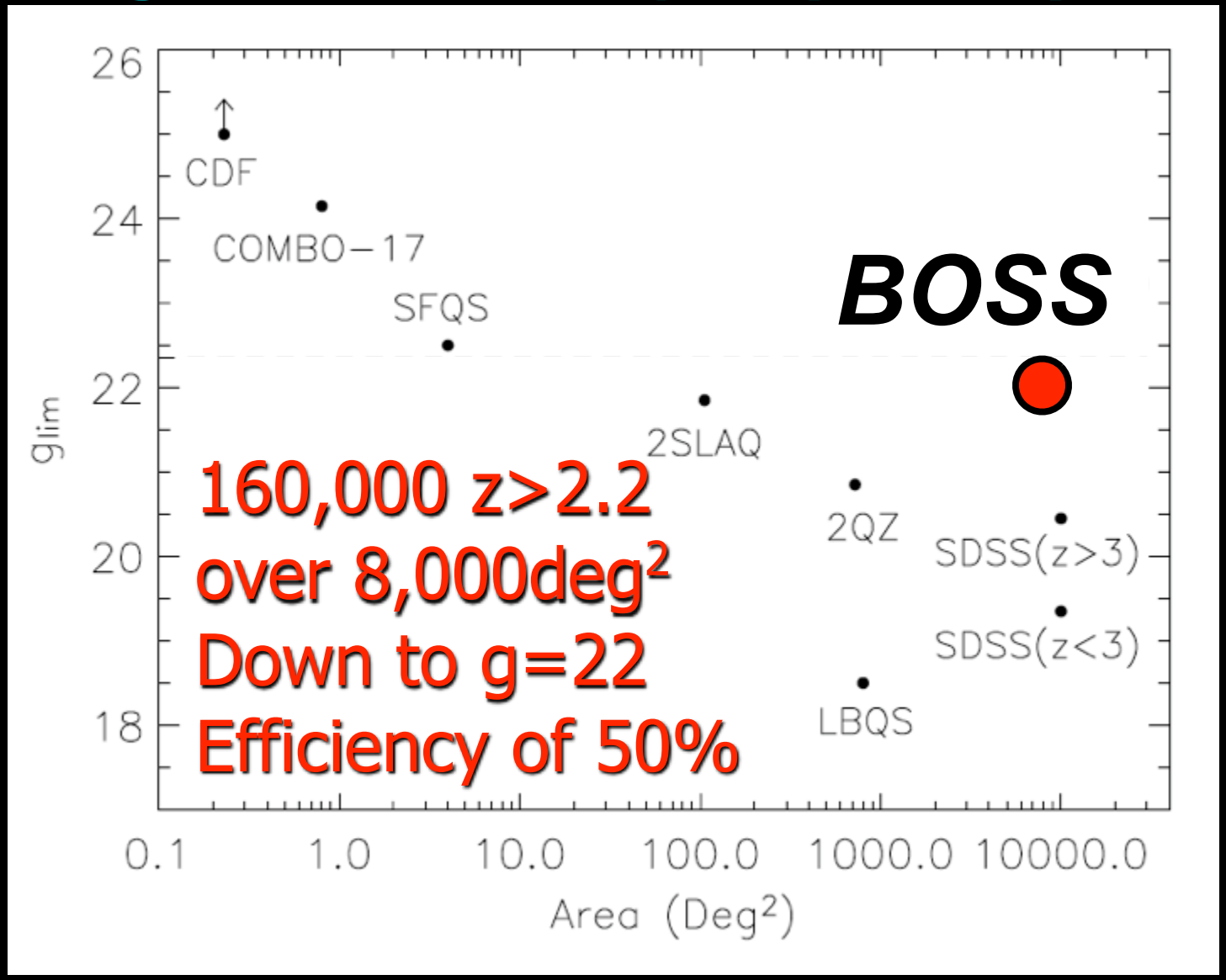
- 480,000 - 1 million LyA Forests
- Redshift range $2.2 < z < 4.0$
- Target density 40-80 deg^{-2}
- Take our cues from "hinky-dink" BOSS... (© A. Bolton)

Issues

- Current "State-of the Art" DR7 has ~11,000 2.2<z<3.5 quasars
- Quasar number counts fall FAST beyond z~2 peak (Richards et al. 2006; Jiang et al. 2006, Hopkins 2007)
- Snag is 2.2<z<3.5 objects defy color selection method.



Pushing the envelope (twice)....



Jiang et al. (2006), Fig. 2

BOSS Quasar Selection for LyAF - current

- Extended "KDE" method used to select SDSS photo-z (e.g. Richards et al. 2009)
- "Neural Networks" (C. Yeche talk)
- Likelihood method
- All just using *ugriz*

BOSS Quasar Selection for LyAF - future

- "Re-train"
- Variability - Palomar Transit Factory (P. Nugent's talk)
- GALEX FUV/NUV information (see Gabor Worseck's talk)
- NIR: UKIDSS (?)

Data (from 25th October 2009)

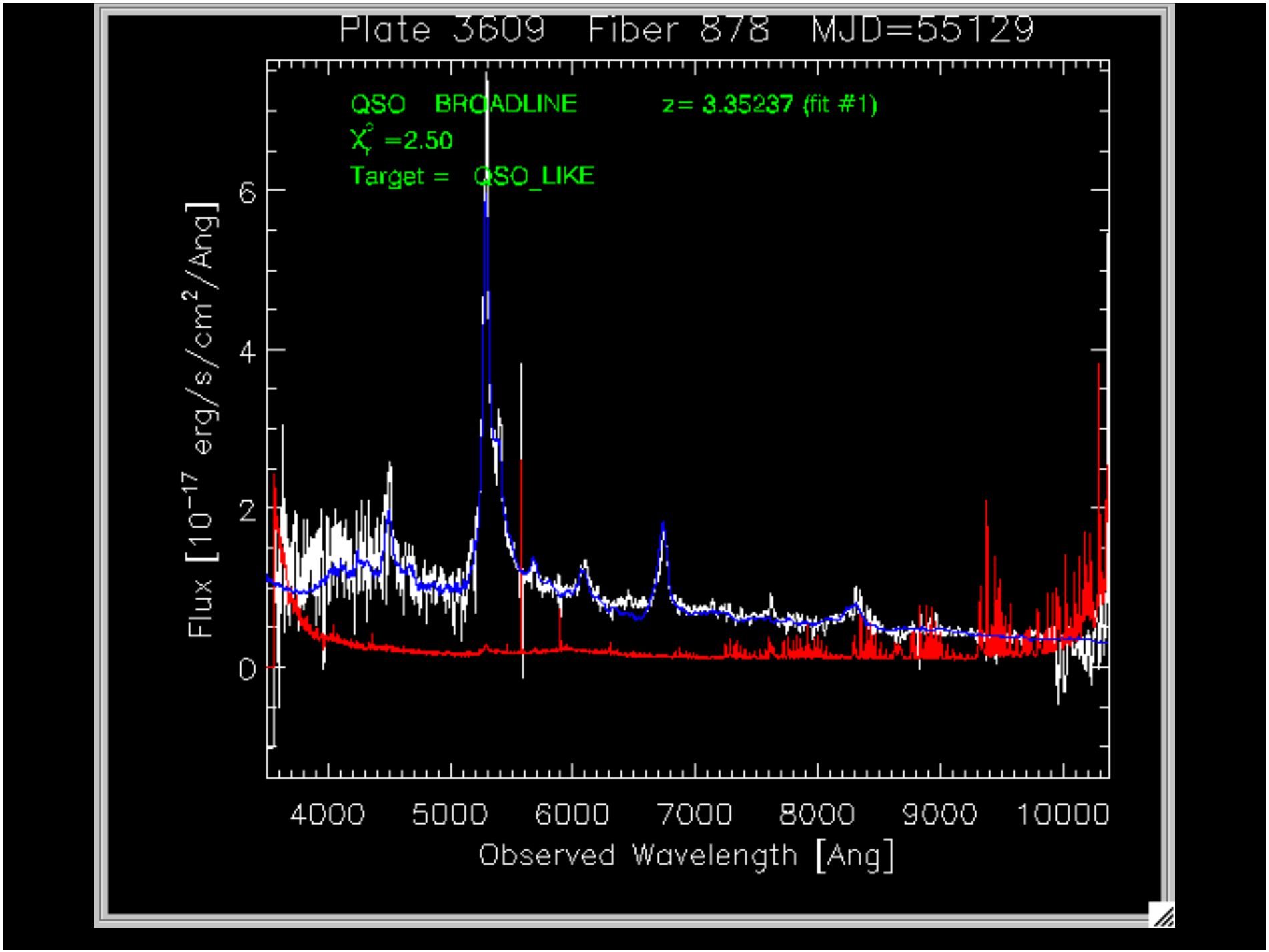


Plate 3609 Fiber 878 MJD=55129
QSO BROADLINE z= 3.35237 (fit #1)
χ^2 =2.50
Target = QSO_LIKE
Flux [10^{-17} erg/s/cm^2/Ang]
0
2
4
6
4000
5000
6000
7000
8000
9000
10000
Observed Wavelength [Ang]

Data (current “poster childs”)

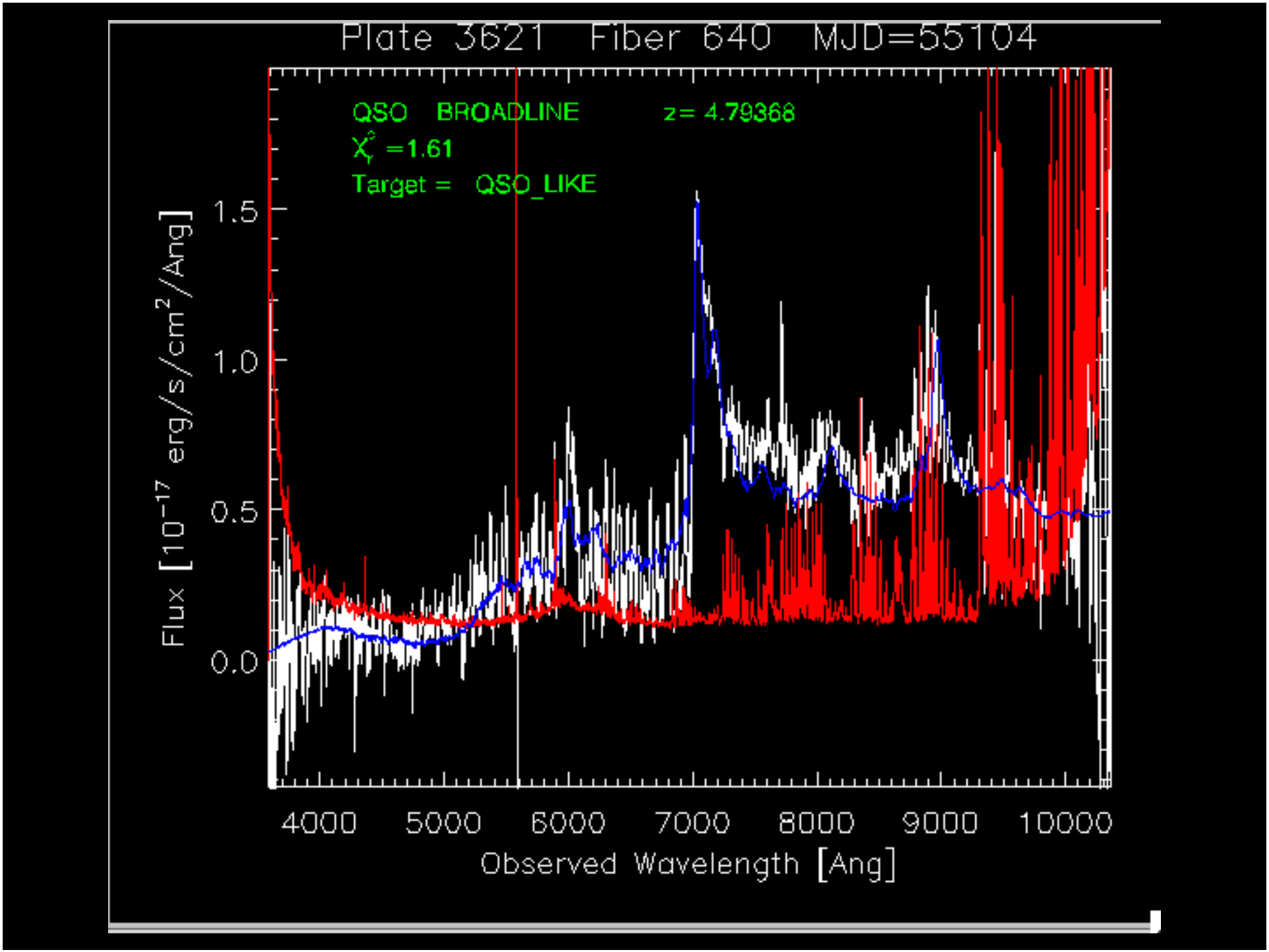


Plate 3621 Fiber 640 MJD=55104
QSO BROADLINE z= 4.79368
χ^2_ν =1.61
Target = QSO_LIKE
Flux [10^{-17} erg/s/cm^2/Ang]
0.0
0.5
1.0
1.5
4000
5000
6000
7000
8000
9000
10000
Observed Wavelength [Ang]

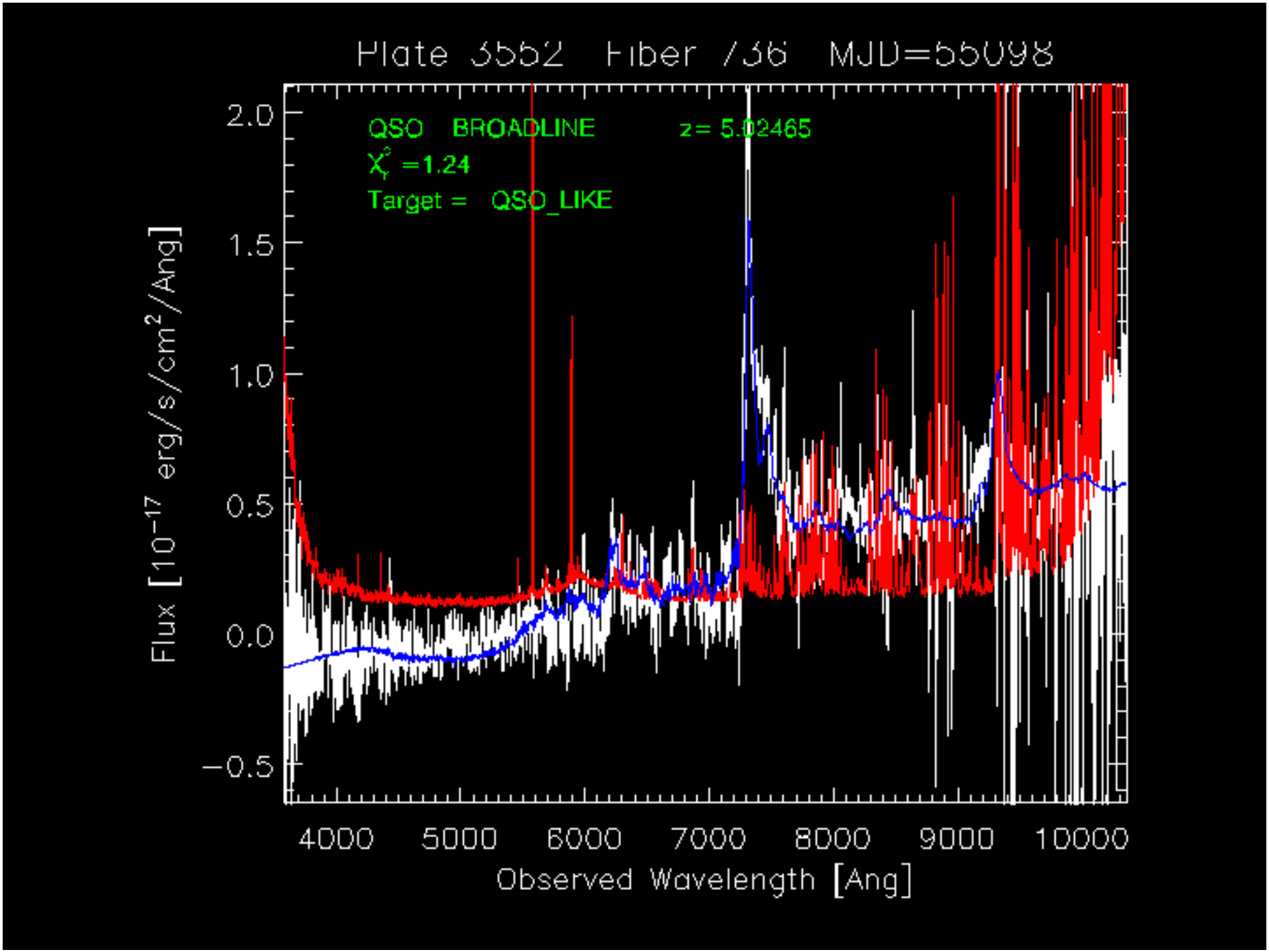
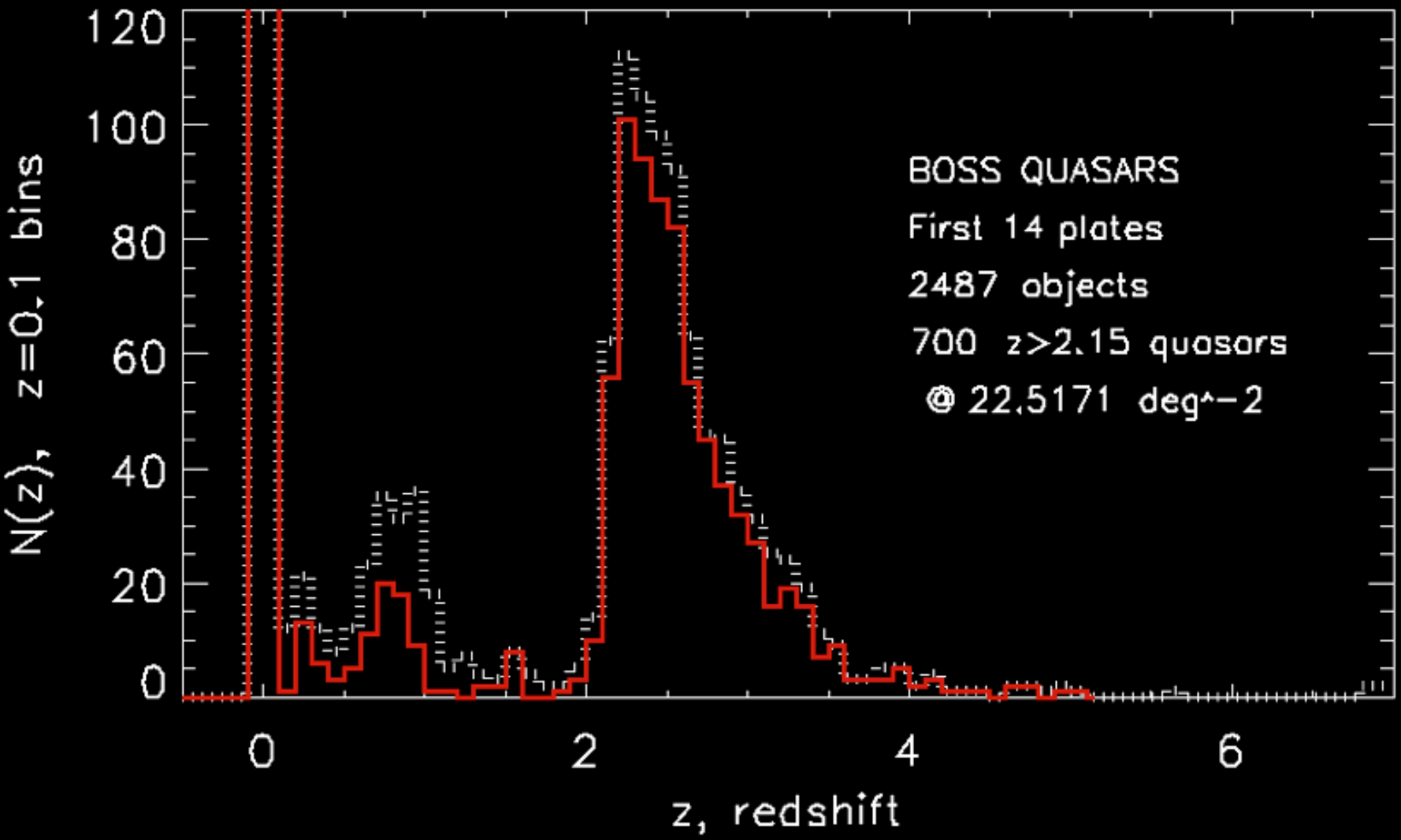


Plate 3552 Fiber 736 MJD=55098
QSO BROADLINE z= 5.02465
χ² =1.24
Target = QSO_LIKE
Flux [10⁻¹⁷ erg/s/cm²/Ang]
2.0
1.5
1.0
0.5
0.0
−0.5
4000
5000
6000
7000
8000
9000
10000
Observed Wavelength [Ang]

First BOSS Results!!



Ross et al. (2010, in prep.)

I'll beat 3 idiots in Bigg Boss: KRK - TV - Entertainment - The Times of India

http://timesofindia.indiatimes.com/entertainment/tv-/Ill-beat-3-idiots-in-Bigg-Boss-KRK/articleshow/5246982.cms

Bigg BOSS

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Bigg BOSS - Google News | Breaking News Online: Kamal K... | I'll beat 3 idiots in Bigg Boss: K...

I'll beat 3 idiots in Bigg Boss: KRK

Text Size: A|A

TNN 19 November 2009, 12:00am IST

Topics: TV Show · Bigg Boss · Kamal Rashid Khan

Kamal Rashid Khan, who was evicted from the Bigg Boss house because of his aggressive and violent behavior with his housemates, will be re-entering the Bigg Boss house as wild card entry. "Yes I am going tonight into the Bigg Boss house as the wild card entry." confirms KRK.

Kamal Rashid Khan

According to him TRP's of the channel went down after his exit. Thus the channel decided to get him back. "The channel got its highest TRP's when I was in Bigg Boss but the day I went out, TRP's became less. Now the channel approached me again and asked me to be there. I am sure this time the TRP's will be higher than ever."

KRK informed us that he followed Bigg Boss even after his eviction. So what is his strategy now? He said, "I will enter the house in a rocket. I don't know whether the housemates will be happy, sad, or surprised by my entry but I promise cent per cent entertainment to my audience."

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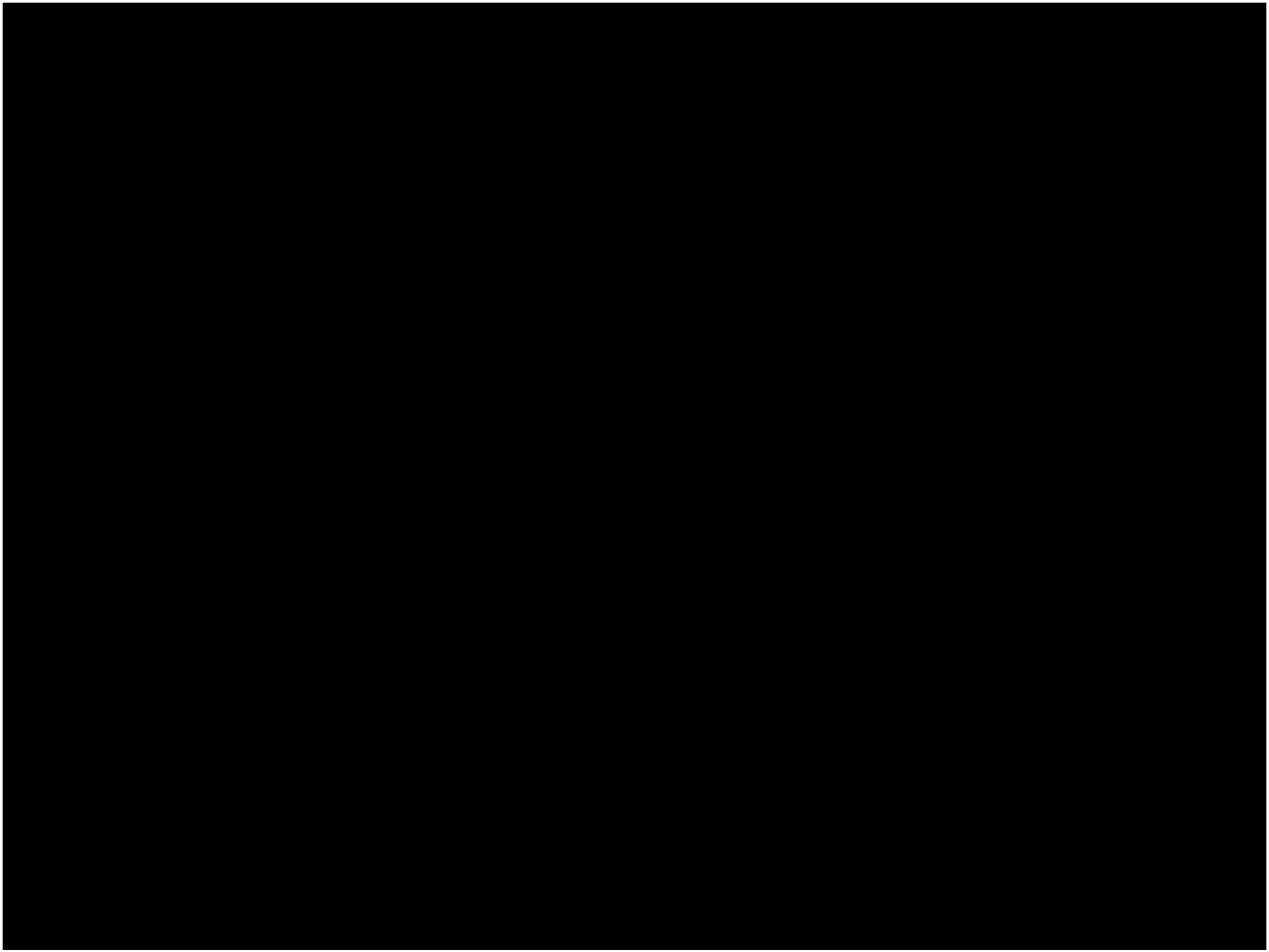
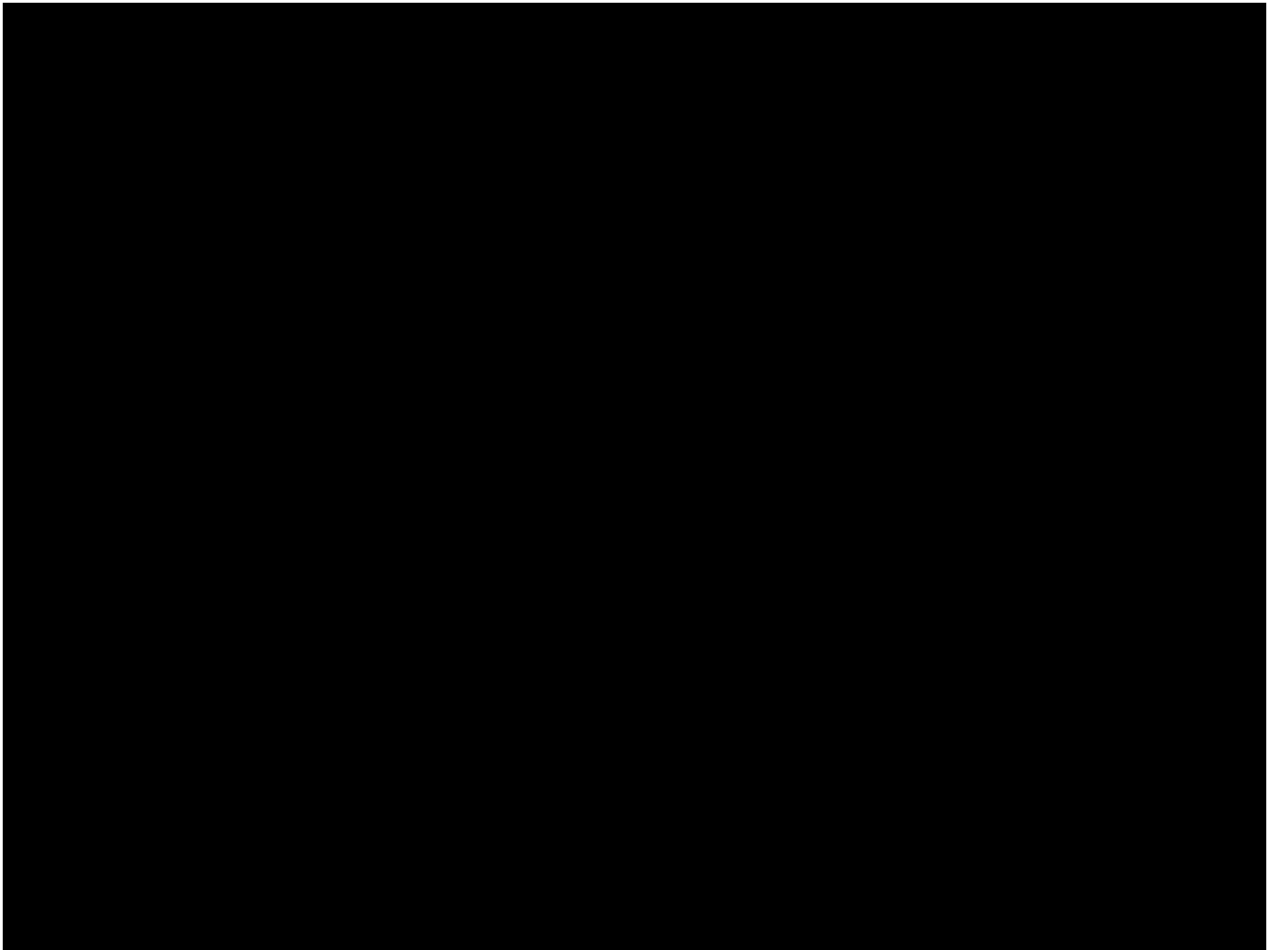
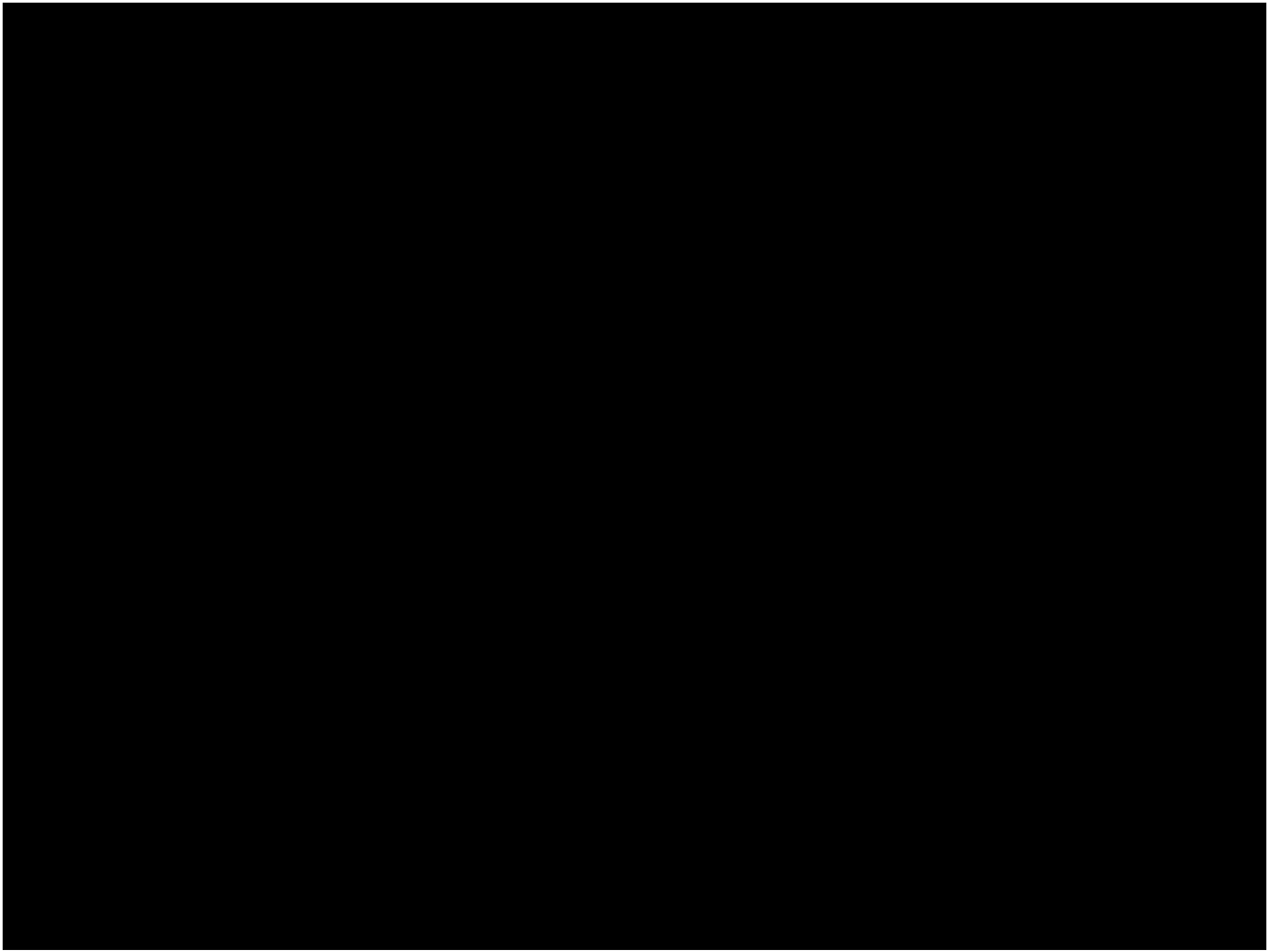
Done







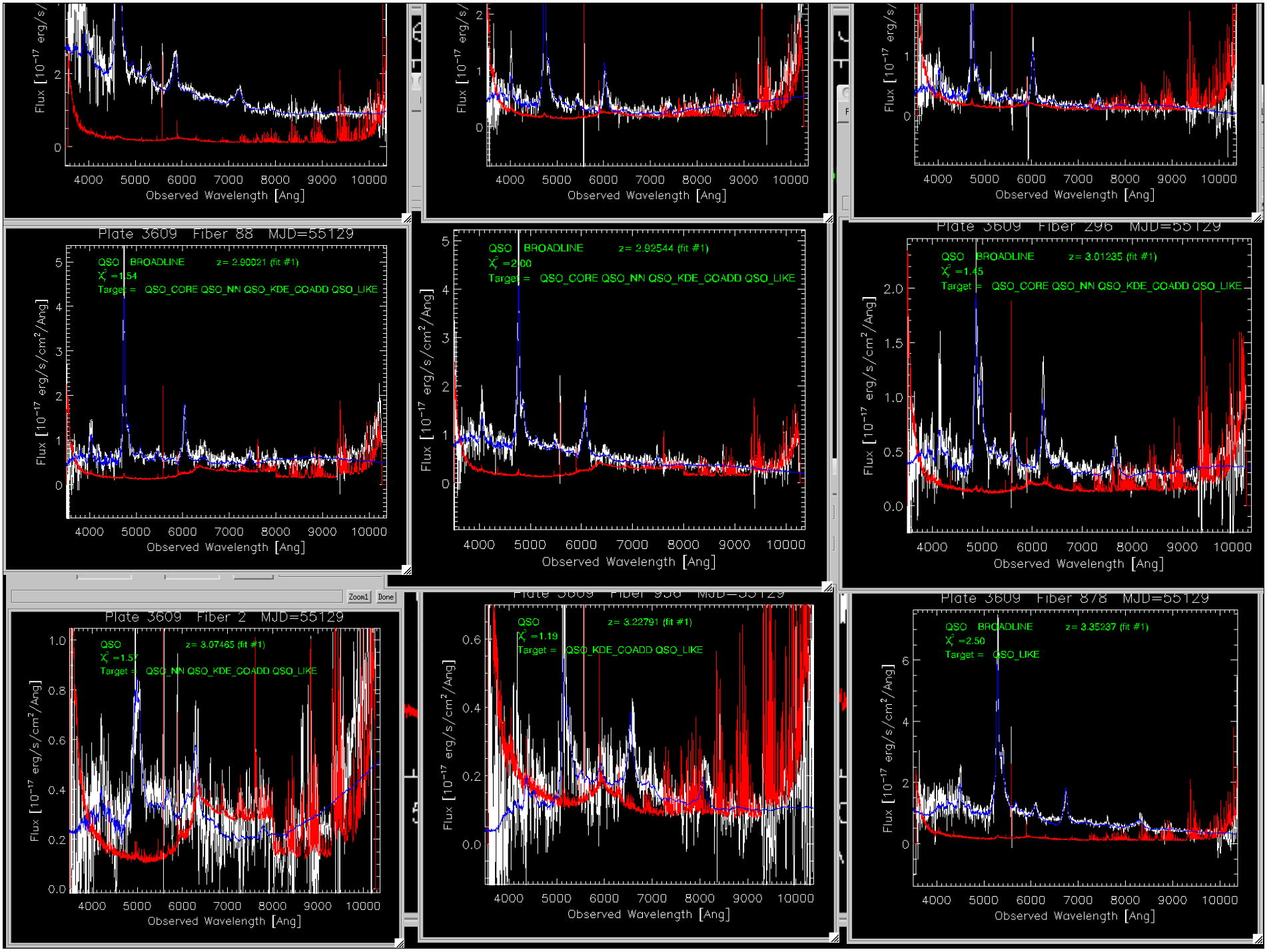


Plate 3609 Fiber 88 MJD=55129
QSO BROADLINE z= 2.90021 (fit #1)
χ²= 1.54
Target = QSO_CORE QSO_NN QSO_KDE_COADD QSO_LIKE
Plate 3609 Fiber 296 MJD=55129
QSO BROADLINE z= 2.92544 (fit #1)
χ²= 2.00
Target = QSO_CORE QSO_NN QSO_KDE_COADD QSO_LIKE
QSO BROADLINE z= 3.01235 (fit #1)
χ²= 1.45
Target = QSO_CORE QSO_NN QSO_KDE_COADD QSO_LIKE
Plate 3609 Fiber 2 MJD=55129
QSO z= 3.07465 (fit #1)
χ²= 1.57
Target = QSO_NN QSO_KDE_COADD QSO_LIKE
QSO z= 3.22791 (fit #1)
χ²= 1.19
Target = QSO_KDE_COADD QSO_LIKE
Plate 3609 Fiber 878 MJD=55129
QSO BROADLINE z= 3.35237 (fit #1)
χ²= 2.50
Target = QSO_LIKE
Flux [10⁻¹⁷ erg/s/cm²/Ang]
Observed Wavelength [Ang]
Zoom1
Done

First (sub per cent) BOSS Results!!

- We're on our way!
- 1 / 60 months (1.7%)
- 14 / 2000 plates (0.7%)
- **31 / 8,000 deg^2 (0.4%)**
- 2487 / 320,000 quasar targets (0.8%)
- **700 / 160,000 z>2.15 quasars (0.4%)**